C216 WS

User Manual

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see
www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Website: http://www.asrock.com

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Chapter 1: Introduction

Thank you for purchasing ASRock ***C216 WS*** motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

In this manual, chapter 1 and 2 contains introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contains the configuration guide to BIOS setup and information of the Support CD.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock website without further notice. You may find the latest VGA cards and CPU support lists on ASRock website as well. ASRock website http://www.asrock.com
If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
www.asrock.com/support/index.asp

1.1 Package Contents

ASRock ***C216 WS*** Motherboard
(ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
ASRock ***C216 WS*** User Manual
ASRock ***C216 WS*** Support CD
6 x Serial ATA (SATA) Data Cables (Optional)
1 x I/O Panel Shield

ASRock Reminds You...
To get better performance in Windows® 8 / 8 64-bit / 7 / 7 64-bit, it is recommended to set the BIOS option in Storage Configuration to AHCI mode.

1.2 Specifications

Platform	- ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm - Premium Gold Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors)
CPU	- Intel® Socket 1155 for 3rd/2nd Generation Core™ i7/Core™ i5/Core™ i3 Processors - Intel® Socket 1155 for Intel® E3-1200/12x5 v2 processors - Supports Intel® 32 nm CPU - Supports Intel® 22 nm CPU - Digi Power Design - 8 + 4 Power Phase Design - Supports Intel® Turbo Boost 2.0 Technology
Chipset	- Intel® C216
Memory	- Dual Channel DDR3 Memory Technology - 4 x DDR3 DIMM slots - Supports DDR3 1600/1333/1066 ECC/non-ECC, un-buffered memory * ECC memory is supported with Xeon® E3 CPU only. - Max. capacity of system memory: 32GB (see **CAUTION 1**)
Expansion Slot	- 2 x PCI Express 3.0 x16 slots (PCIE2/PCIE4: Single at x16 (PCIE2) mode or dual at x8 (PCIE2) / x8 (PCIE4) mode) (see **CAUTION 2**) * PCIE 3.0 is only supported with Intel® Ivy Bridge CPU. With Intel® Sandy Bridge CPU, it only supports PCIE 2.0. - 1 x PCI Express 2.0 x16 slot (PCIE5: x4 mode) - 2 x PCI Express 2.0 x 1 slots - 2 x PCI slots - Supports AMD Quad CrossFireX™, 3-Way CrossFireX™ and CrossFireX™
Graphics	* Intel® HD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated. - Supports Intel® HD Graphics Built-in Visuals: Intel® Quick Sync Video 2.0, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® Insider™, Intel® HD Graphics 2500/4000 with Intel® Ivy Bridge CPU - Supports Intel® HD Graphics Built-in Visuals: Intel® Quick Sync Video, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® HD Graphics 2000/3000, Intel® Advanced Vector Extensions (AVX) with Intel® Sandy Bridge CPU

	- Pixel Shader 5.0, DirectX 11 with Intel® Ivy Bridge CPU. Pixel Shader 4.1, DirectX 10.1 with Intel® Sandy Bridge CPU. - Max. shared memory 1760MB with Intel® Ivy Bridge CPU. Max. shared memory 1759MB with Intel® Sandy Bridge CPU. - Supports HDMI 1.4a Technology with max. resolution up to 1920x1200 @ 60Hz - Supports Auto Lip Sync, Deep Color (12bpc), xvYCC and HBR (High Bit Rate Audio) with HDMI (Compliant HDMI monitor is required) (see **CAUTION 3**) - Supports HDCP function with HDMI port - Supports Full HD 1080p Blu-ray (BD) / HD-DVD playback with HDMI port
Audio	- 7.1 CH HD Audio with Content Protection (Realtek ALC892 Audio Codec) - Premium Blu-ray audio support
LAN	- PCIE x1 Gigabit LAN 10/100/1000 Mb/s - Broadcom BCM57781 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE
Storage	- 2 x SATA3 6.0 Gb/s connectors by Intel® C216, support RAID (RAID 0, RAID 1, RAID 5, RAID 10, Intel Rapid Storage and Intel Smart Response Technology), NCQ, AHCI and “Hot Plug” functions - 4 x SATA3 6.0 Gb/s connectors by ASMedia ASM1061, support NCQ, AHCI and “Hot Plug” functions (SATA3_A4 connector is shared with eSATA3 port) - 4 x SATA2 3.0 Gb/s connectors by Intel® C216, support RAID (RAID 0, RAID 1, RAID 5, RAID 10, Intel Rapid Storage and Intel Smart Response Technology), NCQ, AHCI and Hot Plug functions
Rear Panel I/O	I/O Panel - 1 x PS/2 Keyboard/Mouse Port - 1 x HDMI Port - 1 x Optical SPDIF Out Port - 4 x Ready-to-Use USB 2.0 Ports - 1 x eSATA3 Connector - 6 x Ready-to-Use USB 3.0 Ports

	- 2 x RJ-45 LAN Ports with LED (ACT/LINK LED and SPEED LED) - 1 x IEEE 1394 Port - HD Audio Jack: Rear Speaker/Central/Bass/Line in/Front Speaker/Microphone
USB3.0	- 2 x Rear USB 3.0 ports by Intel® C216, support USB 1.1/2.0/3.0 up to 5Gb/s - 4 x Rear USB 3.0 ports by Etron EJ188H, support USB 1.1/2.0/3.0 up to 5Gb/s - 1 x Front USB 3.0 header by Intel® C216 (supports 2 USB 3.0 ports), supports USB 1.1/2.0/3.0 up to 5Gb/s
Connector	- 1 x IR header - 1 x COM port header - 1 x HDMI_SPDIF header - 1 x IEEE 1394 header - 1 x Power LED header - 2 x CPU Fan connectors (1 x 4-pin, 1 x 3-pin) - 3 x Chassis Fan connectors (1 x 4-pin, 2 x 3-pin) - 1 x Power Fan connector (3-pin) - 24 pin ATX power connector - 8 pin 12V power connector - Front panel audio connector - 2 x USB 2.0 headers (support 4 USB 2.0 ports) - 1 x USB 3.0 header (supports 2 USB 3.0 ports) - 1 x Dr. Debug (7-Segment Debug LED)
BIOS Feature	- 64Mb AMI UEFI Legal BIOS - ACPI 1.1 Compliance Wake Up Events - SMBIOS 2.3.1 Support - CPU Core, IGPU, DRAM, 1.8V PLL, VTT, VCCSA Voltage Multi-adjustment
Support CD	- Drivers, Utilities, AntiVirus Software (Client OS, Trial Version)
Hardware Monitor	- CPU Temperature Sensing - Chassis Temperature Sensing - CPU/Chassis/Power Fan Tachometer - CPU/Chassis Quiet Fan (Allows CPU Fan Speed Auto-Adjust by CPU Temperature) - CPU/Chassis Fan Multi-Speed Control - Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore
OS	- Microsoft® Windows® 8 / 8 64-bit / 7 / 7 64-bit compliant

Certifications	- FCC, CE, WHQL - ErP/EuP Ready (ErP/EuP ready power supply is required)

* For detailed product information, please visit our website: http://www.asrock.com

WARNING

Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

CAUTION!

1. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® 8 / 7. For Windows® OS with 64-bit CPU, there is no such limitation.
2. Only PCIE2 and PCIE4 slots support Gen 3 speed. To run the PCI Express in Gen 3 speed, please install an Ivy Bridge CPU. If you install a Sandy Bridge CPU, the PCI Express will run only at PCI Express Gen 2 speed.
3. xvYCC and Deep Color are only supported under Windows® 8 64-bit / 8 / 7 64-bit / 7. Deep Color mode will be enabled only if the display supports 12bpc in EDID. HBR is supported under Windows® 8 64-bit / 8 / 7 64-bit / 7.

1.3 Unique Features

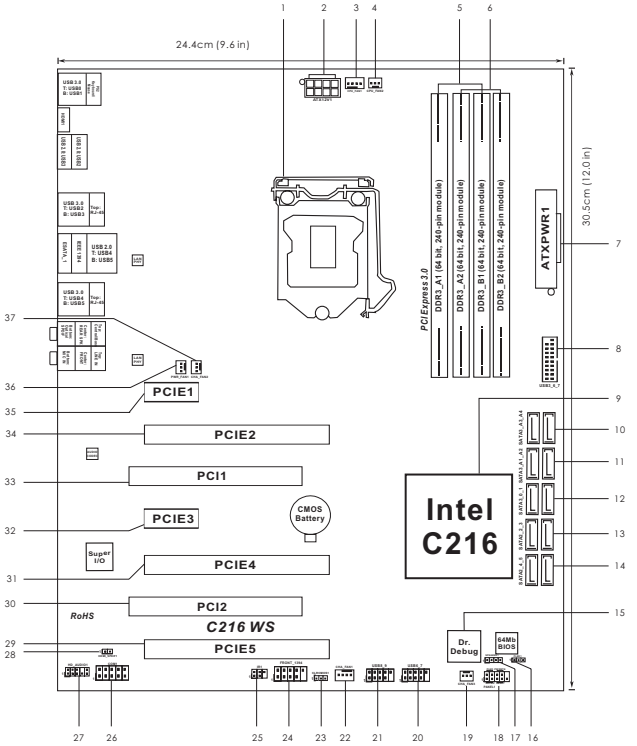
ASRock Instant Flash

ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, you can press the <F6> key during the POST or the <F2> key to enter into the BIOS setup menu to access ASRock Instant Flash. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.

ASRock Crashless BIOS

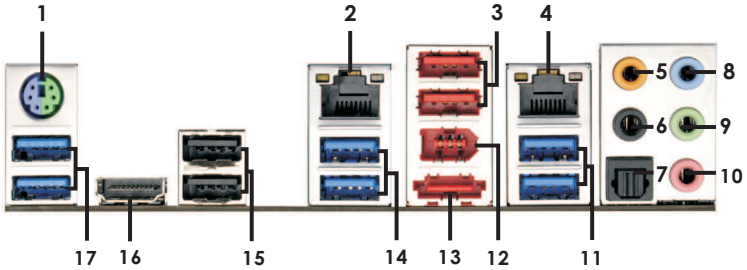
ASRock Crashless BIOS allows users to update their BIOS without fear of failing. If power loss occurs during the BIOS update process, ASRock Crashless BIOS will automatically finish the BIOS update procedure after regaining power. Please note that BIOS files need to be placed in the root directory of your USB disk. Only USB2.0 ports support this feature.

1.4 Motherboard Layout



1	1155-Pin CPU Socket
2	ATX 12V Power Connector (ATX12V1)
3	CPU Fan Connector (CPU_FAN1)
4	CPU Fan Connector (CPU_FAN2)
5	2 x 240-pin DDR3 DIMM Slots (DDR3_A1, DDR3_B1)
6	2 x 240-pin DDR3 DIMM Slots (DDR3_A2, DDR3_B2)
7	ATX Power Connector (ATXPWR1)
8	USB 3.0 Header (USB3_6_7)
9	Intel C216 Chipset
10	SATA3 Connectors (SATA3_A3_A4)
11	SATA3 Connectors (SATA3_A1_A2)
12	SATA3 Connectors (SATA3_0_1)
13	SATA2 Connectors (SATA2_2_3)
14	SATA2 Connectors (SATA2_4_5)
15	Dr. Debug
16	Power LED Header (PLED1)
17	Chassis Speaker Header (SPEAKER1)
18	System Panel Header (PANEL1)
19	Chassis Fan Connector (CHA_FAN3)
20	USB 2.0 Header (USB_6_7)
21	USB 2.0 Header (USB_8_9)
22	Chassis Fan Connector (CHA_FAN1)
23	Clear CMOS Jumper (CLRCMOS1)
24	Front Panel IEEE 1394 Header (FRONT_1394)
25	Infrared Module Header (IR1)
26	COM Port Header (COM1)
27	Front Panel Audio Header (HD_AUDIO1)
28	HDMI_SPDIF Header (HDMI_SPDIF1)
29	PCI Express 2.0 x16 Slot (PCIE5)
30	PCI Slot (PCI2)
31	PCI Express 3.0 x16 Slot (PCIE4)
32	PCI Express 2.0 x1 Slot (PCIE3)
33	PCI Slot (PCI1)
34	PCI Express 3.0 x16 Slot (PCIE2)
35	PCI Express 2.0 x1 Slot (PCIE1)
36	Power Fan Connector (PWR_FAN1)
37	Chassis Fan Connector (CHA_FAN2)

1.5 I/O Panel



1	PS/2 Keyboard/Mouse Port (Purple/Green)	10	Microphone (Pink)
* 2	LAN RJ-45 Port	11	USB 3.0 Ports (USB3_45)
3	USB 2.0 Ports (USB45)	12	IEEE 1394 Port
* 4	LAN RJ-45 Port	*** 13	eSATA3 Port (ESATA_1)
5	Central / Bass (Orange)	14	USB 3.0 Ports (USB3_23)
6	Rear Speaker (Black)	15	USB 2.0 Ports (USB23)
7	Optical SPDIF Out Port	16	HDMI Port (HDMI1)
8	Line In (Light Blue)	17	USB 3.0 Ports (USB3_01)
** 9	Front Speaker (Lime)		

* There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.

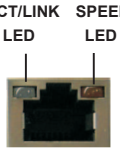
LAN Port LED Indications

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED

Status	Description
Off	10Mbps connection
Orange	100Mbps connection
Green	1Gbps connection



** If you use 2-channel speaker, please connect the speaker's plug into "Front Speaker Jack". See the table below for connection details in accordance with the type of speaker you use.

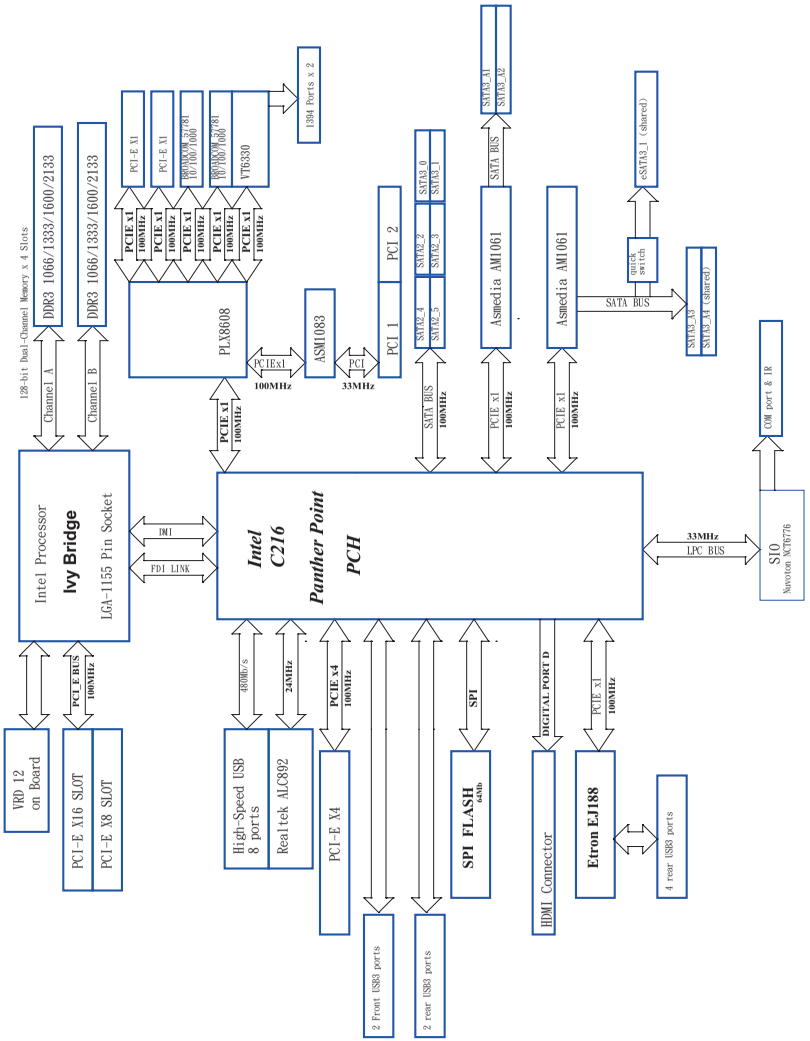
TABLE for Audio Output Connection

Audio Output Channels	Front Speaker (No. 9)	Rear Speaker (No. 6)	Central / Bass (No. 5)	Line In or Side Speaker (No. 8)
2	V	--	--	--
4	V	V	--	--
6	V	V	V	--
8	V	V	V	V

To enable Multi-Streaming function, you need to connect a front panel audio cable to the front panel audio header. After restarting your computer, you will find “Mixer” tool on your system. Please select “Mixer ToolBox” , click “Enable playback multi-streaming”, and click “ok”. Choose “2CH”, “4CH”, “6CH”, or “8CH” and then you are allowed to select “Realtek HDA Primary output” to use Rear Speaker, Central/Bass, and Front Speaker, or select “Realtek HDA Audio 2nd output” to use front panel audio.

*** eSATA3 connector supports SATA Gen3 in cable 1M.

1.6 Block Diagram



Chapter 2: Installation

This is an ATX form factor (12.0" x 9.6", 30.5 x 24.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.

Do not over-tighten the screws! Doing so may damage the motherboard.

2.2 Pre-installation Precautions

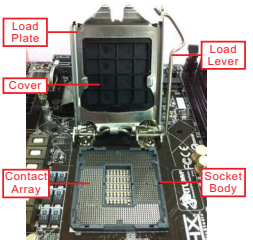
Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the mother-board to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 CPU Installation

In order to provide the LGA 1155 CPU sockets more protection and make the installation process easier, ASRock has added a new protection cover on top of the load plate to replace the former PnP caps that were under the load plate. For the installation of Intel® 1155-Pin CPUs with the new protection cover, please follow the steps below.



1155-Pin Socket Overview

Before you insert the 1155-Pin CPU into the socket, please check if the CPU surface is unclean or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.

Step 1. Open the socket:

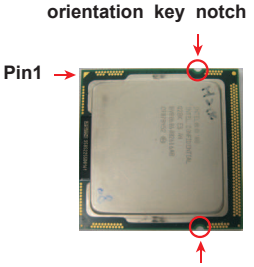
Step 1-1. Disengage the lever by pressing it down and sliding it out of the hook. You do not have to remove the protection cover.

Step 1-2. Keep the lever positioned at about 135 degrees in order to flip up the load plate.

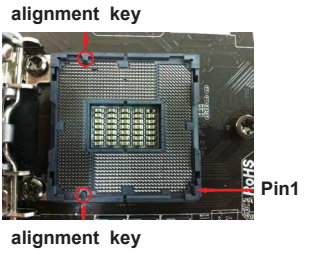
Step 2. Insert the 1155-Pin CPU:

Step 2-1. Hold the CPU by the edge which is marked with a black line.

Step 2-2. Orient the CPU with the IHS (Integrated Heat Sink) up. Locate Pin1 and the two orientation key notches.



1155-Pin CPU



1155-Pin Socket

For proper installation, please ensure to match the two orientation key notches of the CPU with the two alignment keys of the socket.

Step 2-3. Carefully place the CPU into the socket.

Step 2-4. Verify that the CPU is within the socket and properly mated to the orient keys.

Step 3. Close the socket:

Step 3-1. Flip the load plate onto the IHS.

Step 3-2. Press down the load lever, and secure it with the load plate tab under the retention tab. The protection cover will automatically come off by itself.

Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.4 Installation of CPU Fan and Heatsink

This motherboard is equipped with 1155-Pin socket that supports Intel 1155-Pin CPUs. Please adopt the type of heatsink and cooling fan compliant with Intel 1155-Pin CPU to dissipate heat. Before you install the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation. Ensure that the CPU and the heatsink are securely fastened and in good contact with each other. Then connect the CPU fan to the CPU_FAN connector (CPU_FAN1, see page 11, No. 3 or CPU_FAN2, see page 11. No.4).

For proper installation, please kindly refer to the instruction manuals of your CPU fan and heatsink.

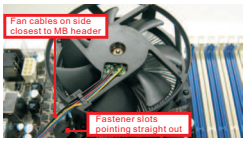
Below is an example to illustrate the installation of the heatsink for 1155-Pin CPUs.

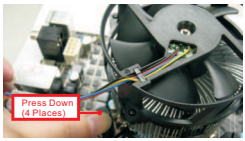
Step 1. Apply thermal interface material onto the center of the IHS on the socket's surface.

Step 2. Place the heatsink onto the socket. Ensure that the fan cables are oriented on side closest to the CPU fan connector on the motherboard (CPU_FAN1, see page 11, No. 3 or CPU_FAN2, see page 11. No.4).

Step 3. Align fasteners with the motherboard through-holes.

Step 4. Rotate the fastener clockwise, then press down on fastener caps with thumb to install and lock. Repeat with remaining fasteners.



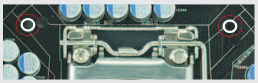


If you press down the fasteners without rotating them clockwise, the heatsink cannot be secured on the motherboard.

Step 5. Connect fan header with the CPU fan connector on the motherboard.

Step 6. Secure redundant cable with tie-wrap to ensure the cable does not interfere with fan operation or contact other components.

Please be noticed that this motherboard supports Combo Cooler Option (C.C.O.), which provides flexible options to adopt three different CPU cooler types, Socket LGA 775, LGA 1155 and LGA 1156. The white throughholes are for Socket LGA 1155/1156 CPU fan.



2.5 Installation of Memory Modules (DIMM)

This motherboard provides four 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology. For dual channel configuration, you always need to install **identical** (the same brand, speed, size and chip-type) DDR3 DIMM pair in the slots: You have to install **identical** DDR3 DIMMs in **Dual Channel A** (DDR3_A1 and DDR3_B1; Black slots; see p.11 No. 5) or **identical** DDR3 DIMMs in **Dual Channel B** (DDR3_A2 and DDR3_B2; Black slots; see p.11 No. 6), so that Dual Channel Memory Technology can be activated. This motherboard also allows you to install four DDR3 DIMMs for dual channel configuration, please install **identical** DDR3 DIMMs in all four slots. You may refer to the Dual Channel Memory Configuration Table below.

Dual Channel Memory Configuration

	DDR3_A1 (Black Slot)	DDR3_A2 (Black Slot)	DDR3_B1 (Black Slot)	DDR3_B2 (Black Slot)
(1)	Populated	-	Populated	-
(2)	-	Populated	-	Populated
(3)*	Populated	Populated	Populated	Populated

* For configuration (3), please install **identical** DDR3 DIMMs in all four slots.

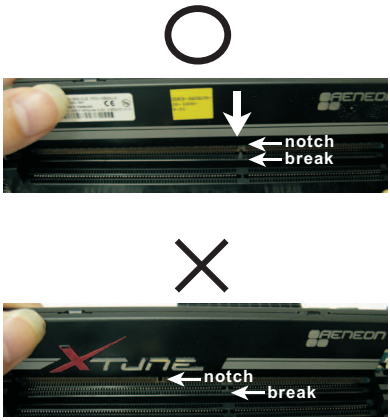
1. If you want to install two memory modules, for optimal compatibility and reliability, it is recommended to install them in the slots: DDR3_A1 and DDR3_B1, or DDR3_A2 and DDR3_B2.
2. If only one memory module or three memory modules are installed in the DDR3 DIMM slots on this motherboard, it is unable to activate Dual Channel Memory Technology.
3. If a pair of memory modules is NOT installed in the same Dual Channel, for example, installing a pair of memory modules in DDR3_A1 and DDR3_A2, it is unable to activate Dual Channel Memory Technology.
4. It is not allowed to install a DDR or DDR2 memory module into DDR3 slot; otherwise, this motherboard and DIMM may be damaged.
5. Some DDR3 1GB double-sided DIMMs with 16 chips may not work on this motherboard. It is not recommended to install them on this motherboard.
6. For optimal compatibility and stability while overclocking memory frequency, it is recommended to install one memory module on DDR3_B2 slot or two memory modules on DDR3_A2 and DDR3_B2 slots.

Installing a DIMM

Please make sure to disconnect power supply before adding or removing DIMMs or the system components.

Step 1. Unlock a DIMM slot by pressing the retaining clips outward.

Step 2. Align a DIMM on the slot such that the notch on the DIMM matches the break on the slot.



The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

Step 3. Firmly insert the DIMM into the slot until the retaining clips at both ends fully snap back in place and the DIMM is properly seated.

2.6 Expansion Slots (PCI and PCI Express Slots)

There are 2 PCI slots and 5 PCI Express slots on this motherboard.

PCI slots: PCI slots are used to install expansion cards that have the 32-bit PCI interface.

PCIE slots: PCIE1 (PCIE 2.0 x1 slot) is used for a PCI Express x1 lane width card, such as a Gigabit LAN card, SATA2 card or ASRock Game Blaster, etc.
PCIE3 (PCIE 2.0 x1 slot) is used for a PCI Express x1 lane width card, such as a Gigabit LAN card, SATA2 card, etc.
PCIE2 (PCIE 3.0 x16 slot) is used for PCI Express x16 lane width graphics cards, or to install PCI Express graphics cards to support CrossFireX™ function.
PCIE4 (PCIE 3.0 x16 slot) is used for PCI Express x8 lane width graphics cards, or to install PCI Express graphics cards to support CrossFireX™ function.
PCIE5 (PCIE 2.0 x16 slot) is used for PCI Express x4 lane width graphics cards, or to install PCI Express graphics cards to support 3-Way CrossFireX™.

1. In single VGA card mode, it is recommended to install a PCI Express x16 graphics card on PCIE2 slot.
2. In CrossFireX™ mode, please install the PCI Express x16 graphics cards on PCIE2 and PCIE4 slots. Therefore, both these two slots will work at x8 bandwidth.
3. In 3-Way CrossFireX™ mode, please install PCI Express x16 graphics cards on PCIE2, PCIE4 and PCIE5 slots. Therefore, PCIE2 and PCIE4 slots will work at x8 bandwidth while PCIE5 slot will work at x4 bandwidth.
4. Please connect a chassis fan to the motherboard's chassis fan connector (CHA_FAN1, CHA_FAN2 or CHA_FAN3) when using multiple graphics cards for better thermal environment.
5. Only PCIE2 and PCIE4 slots support Gen 3 speed. To run the PCI Express in Gen 3 speed, please install an Ivy Bridge CPU. If you install a Sandy Bridge CPU, the PCI Express will run only at PCI Express Gen 2 speed.

Installing an expansion card

Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

2.7 CrossFireX™, 3-Way CrossFireX™ and Quad CrossFireX™ Operation Guide

This motherboard supports CrossFireX™, 3-way CrossFireX™ and Quad CrossFireX™ feature. CrossFireX™ technology offers the most advantageous means available of combining multiple high performance Graphics Processing Units (GPU) in a single PC. Combining a range of different operating modes with intelligent software design and an innovative interconnect mechanism, CrossFireX™ enables the highest possible level of performance and image quality in any 3D application. Please check AMD website for ATI™ CrossFireX™ driver updates.

1. If a customer incorrectly configures their system they will not see the performance benefits of CrossFireX™. All three CrossFireX™ components, a CrossFireX™ Ready graphics card, a CrossFireX™ Ready motherboard and a CrossFireX™ Edition co-processor graphics card, must be installed correctly to benefit from the CrossFireX™ multi-GPU platform.
2. If you pair a 12-pipe CrossFireX™ Edition card with a 16-pipe card, both cards will operate as 12-pipe cards while in CrossFireX™ mode.

2.7.1 Graphics Card Setup

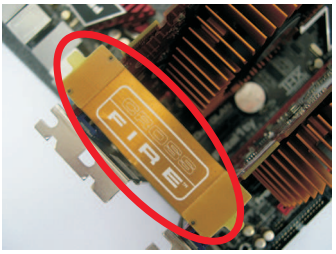
2.7.1.1 Installing Two CrossFireX™-Ready Graphics Cards

Different CrossFireX™ cards may require different methods to enable CrossFireX™ feature. For other CrossFireX™ cards that AMD has released or will release in the future, please refer to AMD graphics card manuals for detailed installation guide.

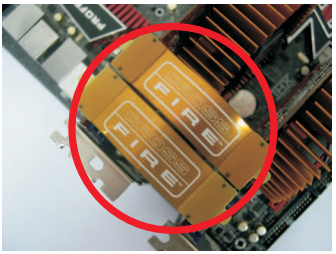
Step 1. Insert one Radeon graphics card into PCIE2 slot and the other Radeon graphics card to PCIE4 slot. Make sure that the cards are properly seated on the slots.

Step 2. Connect two Radeon graphics cards by installing CrossFire Bridge on CrossFire Bridge Interconnects on the top of Radeon graphics cards. (CrossFire Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

CrossFire Bridge



or



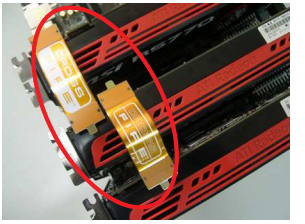
Step 3. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card on PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.)

2.7.1.2 Installing Three CrossFireX™-Ready Graphics Cards

Step 1. Install the identical 3-Way CrossFireX™-ready graphics cards that are AMD certified because different types of graphics cards will not work together properly. (Even the GPU chips version shall be the same.) Insert one graphics card into PCIE2 slot, another graphics card to PCIE4 slot, and the other graphics card to PCIE5 slot. Make sure that the cards are properly seated on the slots.

Step 2. Use one CrossFire™ Bridge to connect Radeon graphics cards on PCIE2 and PCIE4 slots, and use the other CrossFire™ Bridge to connect Radeon graphics cards on PCIE4 and PCIE5 slots. (CrossFire™ Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

CrossFire™ Bridge



Step 3. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card on PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.)

2.7.2 Driver Installation and Setup

Step 1. Power on your computer and boot into OS.

Step 2. Remove the ATI™ driver if you have any VGA driver installed in your system.

The Catalyst Uninstaller is an optional download. We recommend using this utility to uninstall any previously installed Catalyst drivers prior to installation. Please check AMD website for ATI™ driver updates.

Step 3. Install the required drivers to your system.

For Windows® 8 / 7 OS:

Install the CATALYST Control Center. Please check AMD website for details.

Step 4. Restart your computer.

Step 5. Install the VGA card drivers to your system, and restart your computer. Then you will find "ATI Catalyst Control Center" on your Windows® taskbar.

ATI Catalyst Control Center

Step 6. Double-click "ATI Catalyst Control Center". Click "View", select "CrossFireX™", and then check the item "Enable CrossFireX™". Select "2 GPUs" and click "Apply" (if you install two Radeon graphics cards). Select "3 GPUs" and click "OK" (if you install three Radeon graphics cards).

Although you have selected the option "Enable CrossFire™", the CrossFireX™ function may not work actually. Your computer will automatically reboot. After restarting your computer, please confirm whether the option "Enable CrossFire™" in "ATI Catalyst Control Center" is selected or not; if not, please select it again, and then you are able to enjoy the benefit of CrossFireX™ feature.

Step 7. You can freely enjoy the benefit of CrossFireX™, 3-Way CrossFireX™ or Quad CrossFireX™ feature.

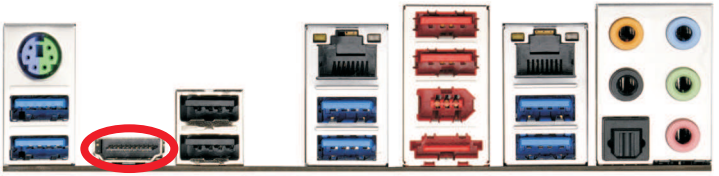
* CrossFireX™ appearing here is a registered trademark of ATI™ Technologies Inc., and is used only for identification or explanation and to the owners' benefit, without intent to infringe.
* For further information of ATI™ CrossFireX™ technology, please check AMD website for updates and details.

2.8 Surround Display Feature

This motherboard supports surround display upgrade. With the internal VGA output support (HDMI port) and external add-on PCI Express VGA cards, you can easily enjoy the benefits of surround display feature.

Please refer to the following steps to set up a surround display environment:

1. Install the PCI Express VGA cards on PCIE2, PCIE4 and PCIE5 slots. Please refer to page 21 for proper expansion card installation procedures.
2. Connect HDMI monitor cable to HDMI port on the I/O panel. Then connect other monitor cables to the corresponding connectors of the add-on PCI Express VGA cards on PCIE2, PCIE4 and PCIE5 slots.



HDMI port

3. Boot your system. Press <F2> or <Del> to enter UEFI setup. Enter “Share Memory” option to adjust the memory capability to [32MB], [64MB], [128MB], [256MB] or [512MB] to enable the function of VGA. Please make sure that the value you select is less than the total capability of the system memory. If you do not adjust the UEFI setup, the default value of “Share Memory”, [Auto], will disable VGA function when an add-on VGA card is inserted to this motherboard.
4. Install the onboard VGA driver and the add-on PCI Express VGA card driver to your system. If you have installed the drivers already, there is no need to install them again.
5. Set up a multi-monitor display.

For Windows® 8 / 8 64-bit / 7 / 7 64-bit OS:

Right click the desktop, choose “Personalize”, and select the “Display Settings” tab so that you can adjust the parameters of the multi-monitors according to the steps below.

A. Click the number ”2” icon.

B. Click the items “This is my main monitor” and “Extend the desktop onto this monitor”.

C. Click “OK” to save your change.

D. Repeat steps A through C for the display icons identified by the number three to seven.

6. Use Surround Display. Click and drag the display icons to positions representing the physical setup of your monitors that you would like to use. The placement of display icons determines how you move items from one monitor to another.

HDCP Function

HDCP function is supported on this motherboard. To use HDCP function with this motherboard, you need to adopt a monitor that supports HDCP function as well. Therefore, you can enjoy the superior display quality with high-definition HDCP encryption contents. Please refer to the instructions below for more details about HDCP function.

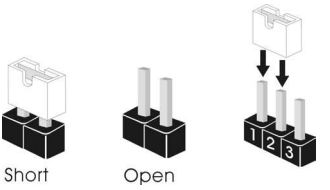
What is HDCP?

HDCP stands for High-Bandwidth Digital Content Protection, a specification developed by Intel® for protecting digital entertainment content that uses the DVI interface. HDCP is a copy protection scheme to eliminate the possibility of intercepting digital data midstream between the video source, or transmitter - such as a computer, DVD player or set-top box - and the digital display, or receiver - such as a monitor, television or projector. In other words, HDCP specification is designed to protect the integrity of content as it is being transmitted.

Products compatible with the HDCP scheme such as DVD players, satellite and cable HDTV set-top-boxes, as well as few entertainment PCs requires a secure connection to a compliant display. Due to the increase in manufacturers employing HDCP in their equipment, it is highly recommended that the HDTV or LCD monitor you purchase is compatible.

2.9 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is “Short”. If no jumper cap is placed on pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when jumper cap is placed on these 2 pins.



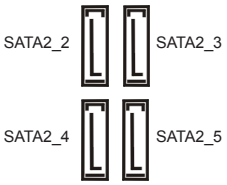
Jumper	Setting	Description
Clear CMOS Jumper (CLRCMOS1) (see p.11, No. 23)	1_2 Default; 2_3 Clear CMOS	

Note: CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile, 1394 GUID and MAC address will be cleared only if the CMOS battery is removed.

2.10 Onboard Headers and Connectors

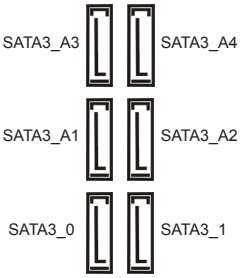
Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard!

Serial ATA2 Connectors
(SATA2_2_3: see p.11, No. 13)
(SATA2_4_5: see p.11, No. 14)



These four Serial ATA2 (SATA2) connectors support SATA data cables for internal storage devices. The current SATA2 interface allows up to 3.0 Gb/s data transfer rate.

Serial ATA3 Connectors
(SATA3_0_1: see p.11, No. 12)
(SATA3_A1_A2: see p.11, No. 11)
(SATA3_A3_A4: see p.11, No. 10)

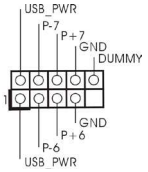


These six Serial ATA3 (SATA3) connectors support SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate. If the eSATA3 port on the rear I/O has been connected, the internal SATA3_A4 will not function.

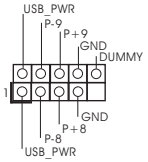
Serial ATA (SATA) Data Cable
(Optional)

Either end of the SATA data cable can be connected to the SATA / SATA2 / SATA3 hard disk or the SATA2 / SATA3 connector on this motherboard.

USB 2.0 Headers
(9-pin USB_6_7)
(see p.11, No. 20)



(9-pin USB_8_9)
(see p.11, No. 21)

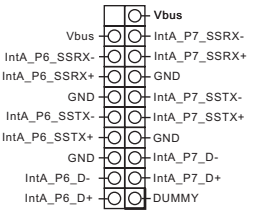


Besides four default USB 2.0 ports on the I/O panel, there are two USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

USB 3.0 Header

(19-pin USB3_6_7)

(see p.11, No. 8)

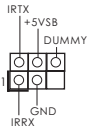


Besides six default USB 3.0 ports on the I/O panel, there is one USB 3.0 header on this motherboard. This USB 3.0 header can support two USB 3.0 ports.

Infrared Module Header

(5-pin IR1)

(see p.11, No. 25)

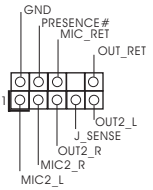


This header supports an optional wireless transmitting and receiving infrared module.

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.11, No. 27)



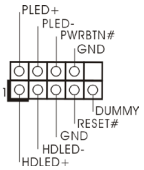
This is an interface for front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.
2. If you use AC'97 audio panel, please install it to the front panel audio header as below:
   A. Connect Mic_IN (MIC) to MIC2_L.
   B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
   C. Connect Ground (GND) to Ground (GND).
   D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.
   E. To activate the front mic.
      For Windows® 8 / 8 64-bit / 7 / 7 64-bit OS:
      Go to the "FrontMic" Tab in the Realtek Control panel. Adjust "Recording Volume".

System Panel Header

(9-pin PANEL1)

(see p.11, No. 18)



This header accommodates several system front panel functions.

Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

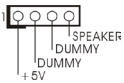
PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).
HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assign-ments are matched correctly.

Chassis Speaker Header

(4-pin SPEAKER 1)

(see p.11, No. 17)



Please connect the chassis speaker to this header.

Power LED Header

(3-pin PLED1)

(see p.11, No. 16)

Please connect the chassis power LED to this header to indicate system power status. The LED is on when the system is operating. The LED keeps blinking in S1/S3 state. The LED is off in S4 state or S5 state (power off).

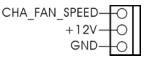
Chassis and Power Fan Connectors

(4-pin CHA_FAN1)

(see p.11, No. 22)

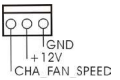
(3-pin CHA_FAN2)

(see p.11, No. 37)



(3-pin CHA_FAN3)

(see p.11, No. 19)



(3-pin PWR_FAN1)

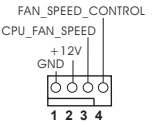
(see p.11, No. 36)

Please connect the fan cables to the fan connectors and match the black wire to the ground pin. CHA_FAN1, CHA_FAN2 and CHA_FAN3 support Fan Control.

CPU Fan Connectors

(4-pin CPU_FAN1)

(see p.11, No. 3)



Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

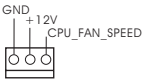
Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

Pin 1-3 Connected

3-Pin Fan Installation

(3-pin CPU_FAN2)

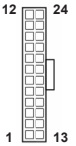
(see p.11, No. 4)



ATX Power Connector

(24-pin ATXPWR1)

(see p.11, No. 7)



Please connect an ATX power supply to this connector.

Though this motherboard provides 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use the 20-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 13.

20-Pin ATX Power Supply Installation

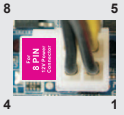
ATX 12V Power Connector

(8-pin ATX12V1)

(see p.11, No. 2)

Please connect an ATX 12V power supply to this connector.

Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply. To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5.

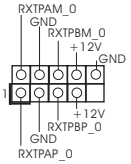


4-Pin ATX 12V Power Supply Installation

IEEE 1394 Header

(9-pin FRONT_1394)

(see p.11 No. 24)

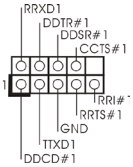


Besides one default IEEE 1394 port on the I/O panel, there is one IEEE 1394 header (FRONT_1394) on this motherboard. This IEEE 1394 header can support one IEEE 1394 port.

Serial port Header

(9-pin COM1)

(see p.11, No. 26)



This COM1 header supports a serial port module.

HDMI_SPDIF Header

(2-pin HDMI_SPDIF1)

(see p.11, No. 28)

HDMI_SPDIF header, providing SPDIF audio output to HDMI VGA card, allows the system to connect HDMI Digital TV/ projector/LCD devices. Please connect the HDMI_SPDIF connector of HDMI VGA card to this header.

2.11 Dr. Debug

Dr. Debug is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Dr. Debug codes.

Status Code	Description
00	Please check if CPU is installed correctly and then clear CMOS.
0d	Problem related to memory, VGA card and other devices. Please clear CMOS, re-install memory and VGA card, and remove other USB, PCI devices.
01 - 54 (except 0d), 5A- 60	Problem related to memory. Please re-install CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
55	Memory could not be detected. Please re-install memory and CPU. If the problem still exists, please install only one memory module or try using other memory modules.
61 - 91	Chipset initialization error. Please press reset or clear CMOS.
92 - 99	Problem related to PCI-E devices. Please re-install PCI-E devices or try installing them in other slots. If the problem still exists, please remove all PCI-E devices or try using another VGA card.
A0 - A7	Problem related to IDE or SATA devices. Please re-install IDE and SATA devices. If the problem still exists, please clear CMOS and try removing all SATA devices.
b0	Problem related to memory. Please re-install CPU and memory. If the problem still exists, please install only one memory module or try using other memory modules.
b4	Problem related to USB devices. Please try removing all USB devices.
b7	Problem related to memory. Please re-install CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
d6	VGA could not be recognized. Please clear CMOS and try re-installing the VGA card. If the problem still exists, please try installing the VGA card in other slots or using other VGA cards.
d7	Keyboard and mouse could not be recognized. Please try re-installing keyboard and mouse.
d8	Invalid Password.
FF	Please check if CPU is installed correctly and then clear CMOS.

2.12 Teaming Function Operation Guide

Dual LAN with Teaming function enabled on this motherboard allows two single connections to act as one single connection for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.

The speed of transmission is subject to the actual network environment or status even with Teaming enabled.

Before setting up Teaming function, please make sure if your Switch (or Router) could support Teaming (IEEE 802.3ad Link Aggregation) function. Then, please refer to following steps to set up Teaming function.

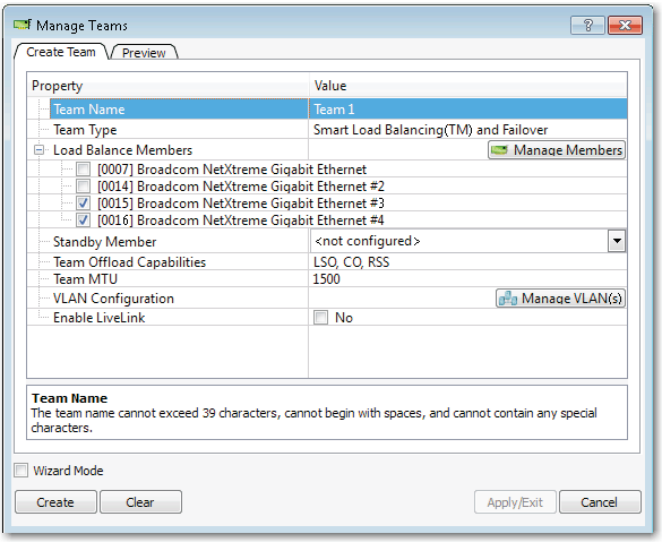
1. Install Teaming driver from the following path of motherboard Support CD:
   32-bit: **.. \Drivers\LAN\Broadcom\Teaming\IA32**
   64-bit: **.. \Drivers\LAN\Broadcom\Teaming\x64**
   (This is a special driver for Teaming function only. If you don't want to use Teaming, please install the LAN driver provided by our support CD link.)

2. From the **Teams** menu, select **Create Team**, or right-click one of the devices in the “Unassigned Adapters” section and select **Create a Team**. This option is not available if there are no devices listed in the “Unassigned Adapters” sections, which means all adapters are already assigned to teams.

3. Click **Expert Mode**.

   * If you want to always use Expert Mode to create a team, click Default to Expert Mode on next start.

4. Click the **Create Team** tab.



* The **Create Team** tab appears only if there are teamable adapters available.

5. Click the **Team Name** field to enter a team name.

6. Click the **Team Type** field to select a team type.

7. Assign any available adapter or adapters to the team by selecting the adapter from the **Load Balance Members** list. There must be at least one adapter selected in the **Load Balance Members** list.

8. You can assign any other available adapter to be a standby member by selecting it from the **Standby Member** list.

* There must be at least one Broadcom network adapter assigned to the team. The Large Send Offload (LSO), Checksum Offload (CO), and RSS indicate if the LSO, CO, and/or RSS properties are supported for the team. The LSO, CO, and RSS properties are enabled for a team only when all of the members support and are configured for the feature.

* Adding a network adapter to a team where its driver is disabled may negatively affect the offloading capabilities of the team. This may have an impact on the team's performance. Therefore, it is recommended that only driver-enabled network adapters be added as members to a team.

9. Type the value for **Team MTU**.

10. Click **Create** to save the team information.

11. Repeat steps 5. through 10. to define additional teams. As teams are defined, they can be selected from the team list, but they have not yet been created. Click the **Preview** tab to view the team structure before applying the changes.

12. Click **Apply/Exit** to create all the teams you have defined and exit the Manage Teams window.

13. Click **Yes** when the message is displayed indicating that the network connection will be temporarily interrupted.

* The team name cannot exceed 39 characters, cannot begin with spaces, and cannot contain any of the following characters: & \ / : * ? < > |

* Team names must be unique. If you attempt to use a team name more than once, an error message is displayed indicating that the name already exists.

* The maximum number of team members is 8.

* When team configuration has been correctly performed, a virtual team adapter driver is created for each configured team.

* If you disable a virtual team and later want to reenable it, you must first disable and reenable all team members before you reenable the virtual team.

* When you create Generic Trunking and Link Aggregation teams, you cannot designate a standby member. Standby members work only with Smart Load Balancing and Failover and SLB (Auto-Fallback Disable) types of teams.

* For an SLB (Auto-Fallback Disable) team, to restore traffic to the load balance members from the standby member, click the Fallback button on the Team Properties tab.

* When configuring an SLB team, although connecting team members to a hub is supported for testing, it is recommended to connect team members to a switch.

* Not all network adapters made by others are supported or fully certified for teaming.

14. Configure the team IP address.

    a. From **Control Panel**, double-click **Network Connections**.

    b. Right-click the name of the team to be configured, and then click **Properties**.

    c. On the **General** tab, click **Internet Protocol (TCP/IP)**, and then click **Properties**.

    d. Configure the IP address and any other necessary TCP/IP configuration for the team, and then click **OK** when finished.

Chapter 3: UEFI SETUP UTILITY

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	To set up the system time/date information
OC Tweaker	To set up overclocking features
Advanced	To set up the advanced UEFI features
Tool	Useful tools
H/W Monitor	To display current hardware status
Boot	To set up the default system device to locate and load the Operating System
Security	To set up the security features
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use < ← > key or < → > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

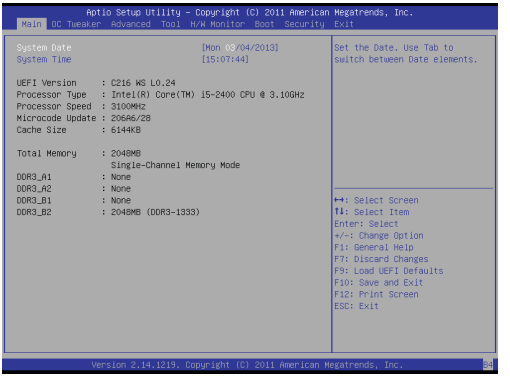
3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Tab>	Switch to next function
<Enter>	To bring up the selected screen
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the UEFI SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

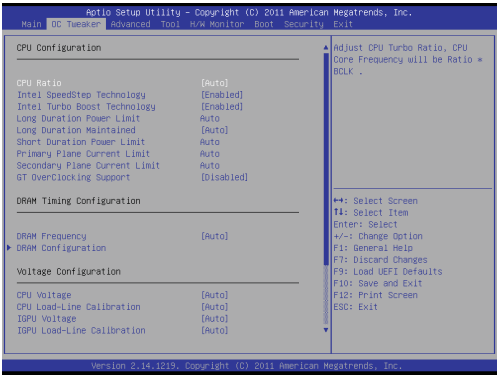
3.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
System Date [Mon 04/04/2013]
System Time [15:07:44]
UEFI Version : C216 WS 1.0.24
Processor Type : Intel(R) Core(TM) i5-2400 CPU @ 3.10GHz
Processor Speed : 3100MHz
Microcode Update : 206A6/28
Cache Size : 6144KB
Total Memory : 2048MB
Single-Channel Memory Mode
DDR3_A1 : None
DDR3_A2 : None
DDR3_B1 : None
DDR3_B2 : 2048MB (DDR3-1333)
Set the Date. Use Tab to switch between Date elements.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

3.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
CPU Configuration
CPU Ratio [Auto]
Intel SpeedStep Technology [Enabled]
Intel Turbo Boost Technology [Enabled]
Long Duration Power Limit Auto
Long Duration Maintained [Auto]
Short Duration Power Limit Auto
Primary Plane Current Limit Auto
Secondary Plane Current Limit Auto
GT OverClocking Support [Disabled]
DRAM Timing Configuration
DRAM Frequency [Auto]
DRAM Configuration
Voltage Configuration
CPU Voltage [Auto]
CPU Load-Line Calibration [Auto]
IGPU Voltage [Auto]
IGPU Load-Line Calibration [Auto]
Adjust CPU Turbo Ratio, CPU Core Frequency will be Ratio * BCLK .
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
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CPU Configuration

CPU Ratio

Use this item to change the ratio value of this motherboard.

Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® 7 / 8 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Use this item to enable or disable Intel Turbo Boost Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

Long Duration Power Limit

Use this item to configure long duration power limit in watts. The default value is [Auto].

Long Duration Maintained

Use this item to configure time window which the long duration power is maintained. The default value is [Auto].

Short Duration Power Limit

Use this item to configure short duration power limit in watts. The default value is [Auto].

Primary Plane Current Limit

Use this item to configure the maximum instantaneous current allowed for the primary plane. The default value is [Auto].

Secondary Plane Current Limit

Use this item to configure the maximum instantaneous current allowed for the secondary plane. The default value is [Auto].

GT OverClocking Support

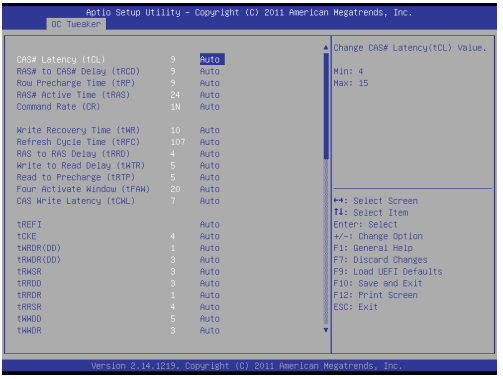
Use this item to enable or disable GT OverClocking Support. The default value is [Disabled].

DRAM Timing Configuration

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

DRAM Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
OC Tweaker
CAS# Latency (tCL) 9 Auto
RAS# to CAS# Delay (tRCD) 9 Auto
Row Precharge Time (tRP) 9 Auto
RAS# Active Time (tRAS) 24 Auto
Command Rate (CR) 1N Auto
Write Recovery Time (tWR) 10 Auto
Refresh Cycle Time (tRFC) 107 Auto
RAS to RAS Delay (tRRD) 4 Auto
Write to Read Delay (tWTR) 5 Auto
Read to Precharge (tRTP) 5 Auto
Four Activate Window (tFAW) 20 Auto
CAS Write Latency (tCWL) 7 Auto
tREFI Auto
tCKE 4 Auto
tWRDR(DD) 1 Auto
tRWDR(DD) 3 Auto
tRWSR 8 Auto
tRRDD 3 Auto
tRRDR 1 Auto
tRRSR 4 Auto
tWDD 5 Auto
tWDR 3 Auto
Change CAS# Latency(tCL) Value.
Min: 4
Max: 15
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

DRAM tCL

Use this item to change CAS# Latency (tCL) Auto/Manual setting. The default is [Auto].

DRAM tRCD

Use this item to change RAS# to CAS# Delay (tRCD) Auto/Manual setting. The default is [Auto].

DRAM tRP

Use this item to change Row Precharge Time (tRP) Auto/Manual setting. The default is [Auto].

DRAM tRAS

Use this item to change RAS# Active Time (tRAS) Auto/Manual setting. The default is [Auto].

Command Rate (CR)

Use this item to change Command Rate (CR) Auto/Manual setting. The default is [Auto].

DRAM tWR

Use this item to change Write Recovery Time (tWR) Auto/Manual setting. The default is [Auto].

DRAM tRFC

Use this item to change Refresh Cyle Time (tRFC) Auto/Manual setting. The default is [Auto].

DRAM tRRD

Use this item to change RAS to RAS Delay (tRRD) Auto/Manual setting. The default is [Auto].

DRAM tWTR

Use this item to change Write to Read Delay (tWTR) Auto/Manual setting. The default is [Auto].

DRAM tRTP

Use this item to change Read to Precharge (tRTP) Auto/Manual setting. The default is [Auto].

DRAM tFAW

Use this item to change Four Activate Window (tFAW) Auto/Manual setting. The default is [Auto].

DRAM tCWL

Use this item to change CAS# Write Latency (tCWL) Auto/Manual setting. The default is [Auto].

tREFI

Use this item to change tREFI setting. The default is [Auto].

tCKE

Use this item to change tCKE setting. The default is [Auto].

tWRDR(DD)

Use this item to change tWRDR(DD) setting. The default is [Auto].

tRWDR(DD)

Use this item to change tRWDR(DD) setting. The default is [Auto].

tRWSR

Use this item to change tRWSR setting. The default is [Auto].

tRRDD

Use this item to change tRRDD setting. The default is [Auto].

tRRDR

Use this item to change tRRDR setting. The default is [Auto].

tRRSR

Use this item to change tRRSR setting. The default is [Auto].

tWWDD

Use this item to change tWWDD setting. The default is [Auto].

tWWDR

Use this item to change tWWDR setting. The default is [Auto].

tWWSR

Use this item to change tWWSR setting. The default is [Auto].

RTL (CHA)

Use this item to change RTL (CHA) setting. The default is [Auto].

RTL (CHB)

Use this item to change RTL (CHB) setting. The default is [Auto].

IO-L (CHA)

Use this item to change IO-L (CHA) setting. The default is [Auto].

IO-L (CHB)

Use this item to change IO-L (CHB) setting. The default is [Auto].

ODT WR (CHA)

Use this item to change ODT WR (CHA) setting. The default is [Auto].

ODT WR (CHB)

Use this item to change ODT WR (CHB) setting. The default is [Auto].

ODT NOM (CHA)

Use this item to change ODT NOM (CHA) setting. The default is [Auto].

ODT NOM (CHB)

Use this item to change ODT NOM (CHB) setting. The default is [Auto].

DRAM Clock Delay

Use this item to enable or disable DRAM Clock Delay. The default is [Auto].

MRC Fast Boot

Use this item to enable or disable MRC Fast Boot. The default is [Enabled].

DIMM Exit Mode

Use this item to select DIMM Exit Mode. The default is [Fast Exit].

Power Down Mode

Use this to control power down mode. The default value is [No Power Down].

Voltage Configuration

CPU Voltage

Use this to select CPU Voltage. The default value is [Auto].

CPU Load-Line Calibration

CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy load.

IGPU Voltage

Use this to select IGPU Voltage. The default value is [Auto].

IGPU Load-Line Calibration

IGPU Load-Line Calibration helps prevent IGPU voltage droop when the system is under heavy load.

DRAM Voltage

Use this to select DRAM Voltage. The default value is [Auto].

VTT Voltage

Use this to select VTT Voltage. The default value is [Auto].

PCH Voltage

Use this to select PCH Voltage. The default value is [Auto].

CPU PLL Voltage

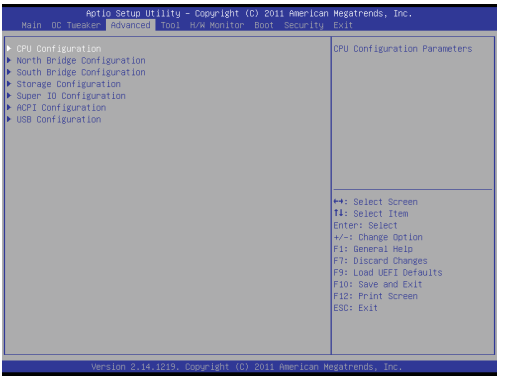
Use this to select CPU PLL Voltage. The default value is [Auto].

VCCSA Voltage

Use this to select VCCSA Voltage. The default value is [Auto].

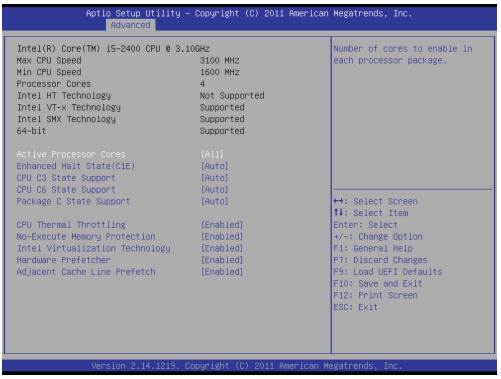
3.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, North Bridge Configuration, South Bridge Configuration, Storage Configuration, Super IO Configuration, ACPI Configuration and USB Configuration.



Setting wrong values in this section may cause the system to malfunction.

3.4.1 CPU Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Intel(R) Core(TM) i5-2400 CPU @ 3.10GHz
Max CPU Speed 3100 MHz
Min CPU Speed 1600 MHz
Processor Cores 4
Intel HT Technology Not Supported
Intel VT-x Technology Supported
Intel SMX Technology Supported
64-bit Supported
Active Processor Cores [All]
Enhanced Halt State(C1E) [Auto]
CPU C3 State Support [Auto]
CPU C6 State Support [Auto]
Package C State Support [Auto]
CPU Thermal Throttling [Enabled]
No-Execute Memory Protection [Enabled]
Intel Virtualization Technology [Enabled]
Hardware Prefetcher [Enabled]
Adjacent Cache Line Prefetch [Enabled]
Number of cores to enable in each processor package.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Intel Hyper Threading Technology

To enable this feature, a computer system with an Intel processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology, such as Microsoft® Windows® 7 / 8 is required. Set to [Enabled] if using Microsoft® Windows® 7, 8, or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

Active Processor Cores

Use this item to select the number of cores to enable in each processor package. The default value is [All].

Enhance Halt State (C1E)

All processors support the Halt State (C1). The C1 state is supported through the native processor instructions HLT and MWAIT and requires no hardware support from the chipset. In the C1 power state, the processor maintains the context of the system caches.

CPU C3 State Support

Use this to enable or disable CPU C3 (ACPI C2) report to OS.

CPU C6 State Support

Use this to enable or disable CPU C6 (ACPI C3) report to OS.

Package C State Support

Selected option will program into C State package limit register. The default value is [Auto].

CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheating.

No-Execute Memory Protection

No-Execution (NX) Memory Protection Technology is an enhancement

to the IA-32 Intel Architecture. An IA-32 processor with “No Execute (NX) Memory Protection” can prevent data pages from being used by malicious software to execute codes. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

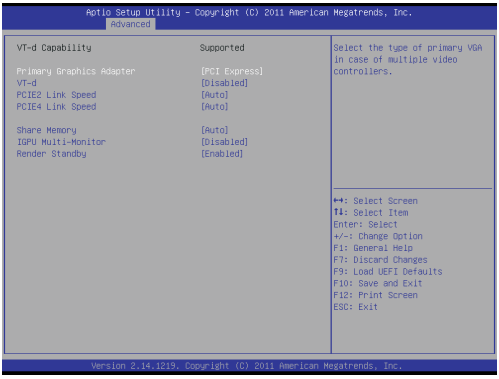
Hardware Prefetcher

Use this item to turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

3.4.2 North Bridge Configuration



Primary Graphics Adapter

This allows you to select [Onboard], [PCI] or [PCI Express] as the boot graphic adapter priority. The default value is [PCI Express].

VT-d

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

PCIE2 Link Speed

This allows you to select PCIE2 Link Speed. The default value is [Auto].

PCIE4 Link Speed

This allows you to select PCIE4 Link Speed. The default value is [Auto].

Share Memory

This allows you to set onboard VGA share memory feature. The default value is [Auto].

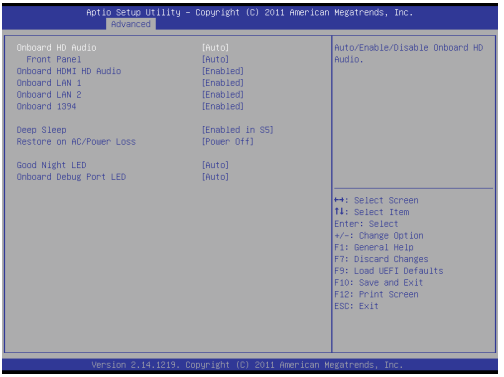
IGPU Multi-Moniter

This allows you to enable or disable IGPU Multi-Moniter. The default value is [Disabled]. If you install the PCI Express card under Windows® XP / Vista™ OS, please disable this option.

Render Standby

Use this to enable or disable Render Standby by Internal Graphics Device. The default value is [Enabled].

3.4.3 South Bridge Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Onboard HD Audio [Auto]
Front Panel [Auto]
Onboard HDMI HD Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Onboard 1394 [Enabled]
Deep Sleep [Enabled in S5]
Restore on AC/Power Loss [Power Off]
Good Night LED [Auto]
Onboard Debug Port LED [Auto]
Auto/Enable/Disable Onboard HD Audio.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
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Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged.

Front Panel

Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

Onboard HDMI HD Audio

This allows you to enable or disable the Onboard HDMI HD Audio feature.

Onboard LAN 1

This allows you to enable or disable the Onboard LAN 1 feature.

Onboard LAN 2

This allows you to enable or disable the Onboard LAN 2 feature.

Onboard 1394

This allows you to enable or disable the Onboard 1394 feature.

Deep Sleep

Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. The default value is [Enabled in S5].

Restore on AC/Power Loss

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers.

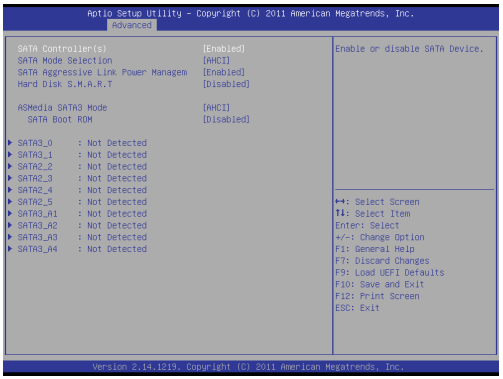
Good Night LED

Use this item to enable or disable Power LED and LAN LED.

Onboard Debug Port LED

Use this item to enable or disable Onboard Debug Port LED.

3.4.4 Storage Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [AHCI]
SATA Aggressive Link Power Managem [Enabled]
Hard Disk S.M.A.R.T [Disabled]
ASMedia SATA3 Mode [AHCI]
SATA Boot ROM [Disabled]
SATA3_0 : Not Detected
SATA3_1 : Not Detected
SATA2_2 : Not Detected
SATA2_3 : Not Detected
SATA2_4 : Not Detected
SATA2_5 : Not Detected
SATA3_A1 : Not Detected
SATA3_A2 : Not Detected
SATA3_A3 : Not Detected
SATA3_A4 : Not Detected
Enable or disable SATA Device.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

SATA Controller(s)

Use this item to enable or disable the SATA Controller feature.

SATA Mode Selection

This item is for SATA3_0, SATA3_1 and SATA2_2 to SATA2_5 ports. Use this to select SATA mode. Configuration options: [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

SATA Aggressive Link Power Management

Use this item to configure SATA Aggressive Link Power Management.

Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].

ASMedia SATA3 Mode

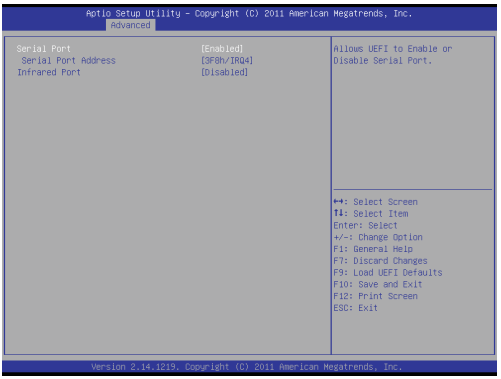
This item is for SATA3_A1 to SATA3_A4 ports. Use this to select ASMedia SATA3 mode. Configuration options: [IDE Mode], [AHCI Mode] and [Disabled]. The default value is [AHCI Mode].

SATA Boot ROM

Use this to enable or disable ASMedia SATA Boot ROM. The default value is [Disabled].

We recommend to use Intel® C216 SATA ports (SATA3_0, SATA3_1, SATA2_2, SATA2_3, SATA2_4 and SATA2_5) for your bootable devices. This will minimum your boot time and get the best performance. But if you still want to boot from ASMedia SATA3 controller, you can still enable this in UEFI.

3.4.5 Super IO Configuration



Serial Port

Use this item to enable or disable the onboard serial port.

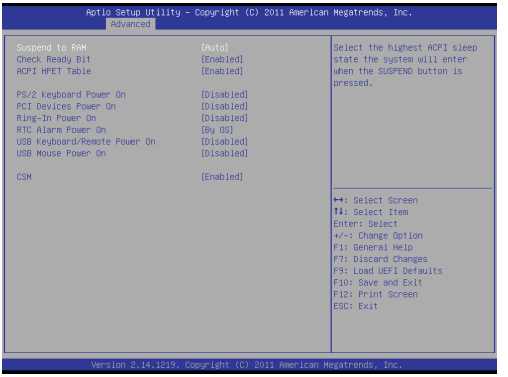
Serial Port Address

Use this item to set the address for the onboard serial port. Configuration options: [3F8h / IRQ4] and [3E8h / IRQ4].

Infrared Port

Use this item to enable or disable the onboard infrared port.

3.4.6 ACPI Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Suspend to RAM [Auto]
Check Ready Bit [Enabled]
ACPI HPET Table [Enabled]
PS/2 Keyboard Power On [Disabled]
PCI Devices Power On [Disabled]
Ring-In Power On [Disabled]
RTC Alarm Power On [By OS]
USB Keyboard/Remote Power On [Disabled]
USB Mouse Power On [Disabled]
CSM [Enabled]
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
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Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Selecting [Auto] will enable this feature if the OS supports it.

Check Ready Bit

Use this item to enable or disable the feature Check Ready Bit.

ACPI HPET Table

Use this item to enable or disable ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® certification.

PS/2 Keyboard Power On

Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode.

PCI Devices Power On

Use this item to enable or disable PCI devices to turn on the system from the power-soft-off mode.

Ring-In Power On

Use this item to enable or disable Ring-In signals to turn on the system from the power-soft-off mode.

RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

USB Keyboard/Remote Power On

Use this item to enable or disable USB Keyboard/Remote to turn on the system from the power-soft-off mode.

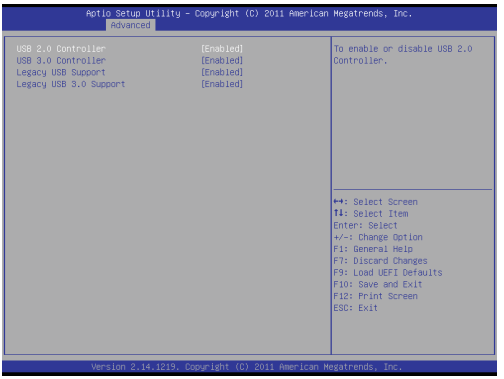
USB Mouse Power On

Use this item to enable or disable USB Mouse to turn on the system from the power-soft-off mode.

CSM

Please disable CSM when you enable Fast Boot option. The default value is [Enabled].

3.4.7 USB Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
USB 2.0 Controller [Enabled]
USB 3.0 Controller [Enabled]
Legacy USB Support [Enabled]
Legacy USB 3.0 Support [Enabled]
To enable or disable USB 2.0 Controller.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

USB 2.0 Controller

Use this item to enable or disable the use of USB 2.0 controller.

USB 3.0 Controller

Use this item to enable or disable the use of USB 3.0 controller.

Legacy USB Support

Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto], [Disabled] and [UEFI Setup Only]. The default value is [Enabled]. Please refer to below descriptions for the details of these four options:

[Enabled] - Enables support for legacy USB.

[Auto] - Enables legacy support if USB devices are connected.

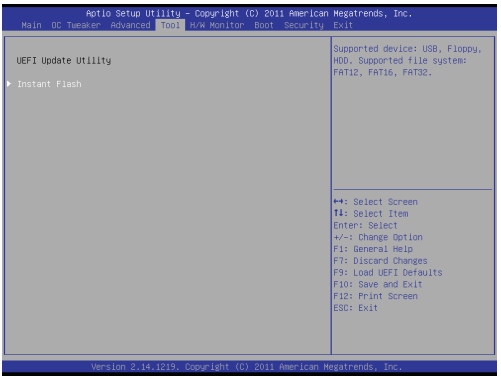
[Disabled] - USB devices are not allowed to use under legacy OS and UEFI setup when [Disabled] is selected. If you have USB compatibility issues, it is recommended to select [Disabled] to enter OS.

[UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS.

Legacy USB 3.0 Support

Use this option to enable or disable legacy support for USB 3.0 devices. The default value is [Enabled].

3.5 Tool


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
UEFI Update Utility
Instant Flash
Supported device: USB, Floppy, HDD. Supported file system: FAT12, FAT16, FAT32.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

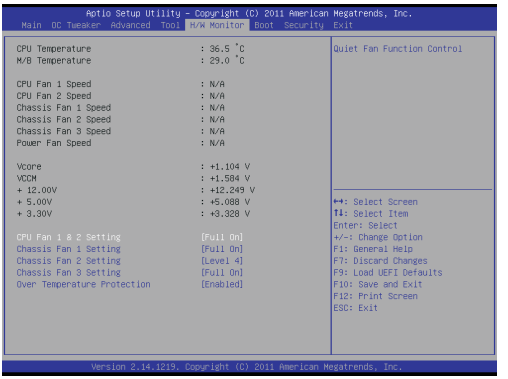
UEFI Update Utility

Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed.

3.6 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
CPU Temperature : 36.5 °C
M/B Temperature : 29.0 °C
CPU Fan 1 Speed : N/A
CPU Fan 2 Speed : N/A
Chassis Fan 1 Speed : N/A
Chassis Fan 2 Speed : N/A
Chassis Fan 3 Speed : N/A
Power Fan Speed : N/A
Vcore : +1.104 V
VCCM : +1.504 V
+ 12.00V : +12.249 V
+ 5.00V : +5.088 V
+ 3.30V : +3.328 V
CPU Fan 1 & 2 Setting [Full On]
Chassis Fan 1 Setting [Full On]
Chassis Fan 2 Setting [Level 4]
Chassis Fan 3 Setting [Full On]
Over Temperature Protection [Enabled]
Quiet Fan Function Control
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

CPU Fan 1 & 2 Setting

This allows you to set CPU fan 1 & 2's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

Chassis Fan 1 Setting

This allows you to set chassis fan 1's speed. Configuration options: [Full On], [Automatic Mode] and [Manual]. The default value is [Full On].

Chassis Fan 2 Setting

This allows you to set chassis fan 2's speed. Configuration options: [Level 1] to [Level 4]. The default is value [Level 4].

Chassis Fan 3 Setting

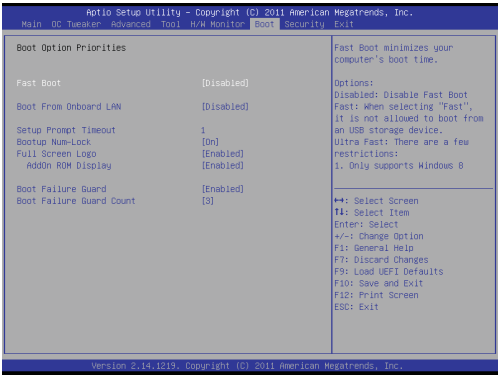
This allows you to set chassis fan 3's speed. Configuration options: [Full On] and [Manual]. The default value is [Full On].

Over Temperature Protection

Use this to enable or disable Over Temperature Protection. The default value is [Enabled].

3.7 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
Boot Option Priorities
Fast Boot [Disabled]
Boot From Onboard LAN [Disabled]
Setup Prompt Timeout 1
Bootup Num-Lock [On]
Full Screen Logo [Enabled]
AddOn ROM Display [Enabled]
Boot Failure Guard [Enabled]
Boot Failure Guard Count [3]
Fast Boot minimizes your computer's boot time.
Options:
Disabled: Disable Fast Boot
Fast: When selecting "Fast", it is not allowed to boot from an USB storage device.
Ultra Fast: There are a few restrictions:
1. Only supports Windows 8
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Fast Boot

Fast Boot minimizes your computer's boot time. There are three configuration options: [Disabled], [Fast] and [Ultra Fast]. The default value is [Disabled]. Please refer to below descriptions for the details of these three options:

[Disabled] - Disable Fast Boot.

[Fast] - The only restriction is you may not boot by using an USB flash drive.

[Ultra Fast] - There are a few restrictions.

1. Only supports Windows® 8 UEFI operating system.
2. You will not be able to enter BIOS Setup (Clear CMOS or run utility in Widows® to enter BIOS Setup).
3. If you are using an external graphics card, the VBIOS must support UEFI GOP in order to boot.

Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key.

Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Enabled].

AddOn ROM Display

Use this option to adjust AddOn ROM Display. If you enable the option “Full Screen Logo” but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

Boot Failure Guard

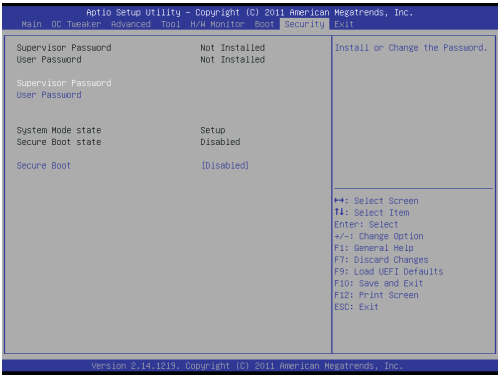
Enable or disable the feature of Boot Failure Guard.

Boot Failure Guard Count

Enable or disable the feature of Boot Failure Guard Count.

3.8 Security Screen

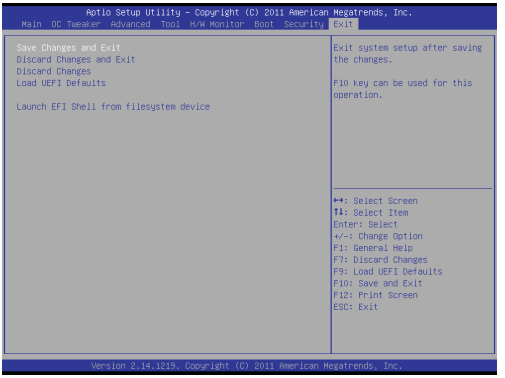
In this section, you may set or change the supervisor/user password for the system. For the user password, you may also clear it.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
Supervisor Password Not Installed
User Password Not Installed
Supervisor Password
User Password
System Mode state Setup
Secure Boot state Disabled
Secure Boot [Disabled]
Install or Change the Password.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Secure Boot

Use this to enable or disable Secure Boot. The default value is [Disabled].

3.9 Exit Screen


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main OC Tweaker Advanced Tool H/W Monitor Boot Security Exit
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load UEFI Defaults
Launch EFI Shell from filesystem device
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
F12: Print Screen
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Save Changes and Exit

When you select this option, the following message “Save configuration changes and exit setup?” will pop-out. Select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option, the following message “Discard changes and exit setup?” will pop-out. Select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, the following message “Discard changes?” will pop-out. Select [Yes] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.

Chapter 4: Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® operating systems: 8 / 8 64-bit / 7 / 7 64-bit. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASSETUP.EXE" from the BIN folder in the Support CD to display the menu.

4.2.2 Drivers Menu

The Drivers Menu shows the available device's drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

4.2.3 Utilities Menu

The Utilities Menu shows the application softwares that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

4.2.4 Contact Information

If you need to contact ASRock or want to know more about ASRock, welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information.

Chapter 5: Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.

Always unplug the power cord before adding, removing or changing any hardware components. Failure to do so may cause physical injuries to you and damages to motherboard components.

1. Disconnect the power cable and check whether the PWR LED is off.
2. Unplug all cables, connectors and remove all add-on cards from the motherboard. Make sure that the jumpers are set to default settings.
3. Confirm that there are no short circuits between the motherboard and the chassis.
4. Install a CPU and fan on the motherboard, then connect the chassis speaker and power LED.

If there is no power...

1. Confirm that there are no short circuits between the motherboard and the chassis.
2. Make sure that the jumpers are set to default settings.
3. Check the settings of the 115V/230V switch on the power supply.
4. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.

If there is no video...

1. Try replugging the monitor cables and power cord.
2. Check for memory errors.

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR3 1600/1333/1066 ECC DIMMs.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

1. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.
2. Confirm whether your power supply provides adaquate and stable power.

Other problems...

1. Try searching keywords related to your problem on ASRock's FAQ page:
   http://www.asrock.com/support/faq.asp
2. Try downloading and updating the latest UEFI on ASRock's website:
   http://www.asrock.com/support/download.asp

5.2 Technical Support Procedures

If you have tried the troubleshooting procedures mentioned above and the problems are still unsolved, please contact ASRock's technical support with the following information:

1. Your contact information
2. Model name, BIOS version and problem type.
3. System configuration.
4. Problem description.

You may contact ASRock's technical support at:
http://www.asrock.com/support/tsd.asp

5.3 Returning Merchandise for Service

For warranty service, the receipt or a copy of your invoice marked with the date of purchase is required. By calling your vendor or going to our RMA website (http://www.asrock.com/support/index.asp?cat=RMA) you may obtain a Returned Merchandise Authorization (RMA) number.
The RMA number should be displayed on the outside of the shipping carton which is mailed prepaid or hand-carried when you return the motherboard to the manufacturer. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty does not cover damages incurred in shipping or from failure due to alteration, misuse, abuse or improper maintenance of products.

Contact your distributor first for any product related problems during the warranty period.